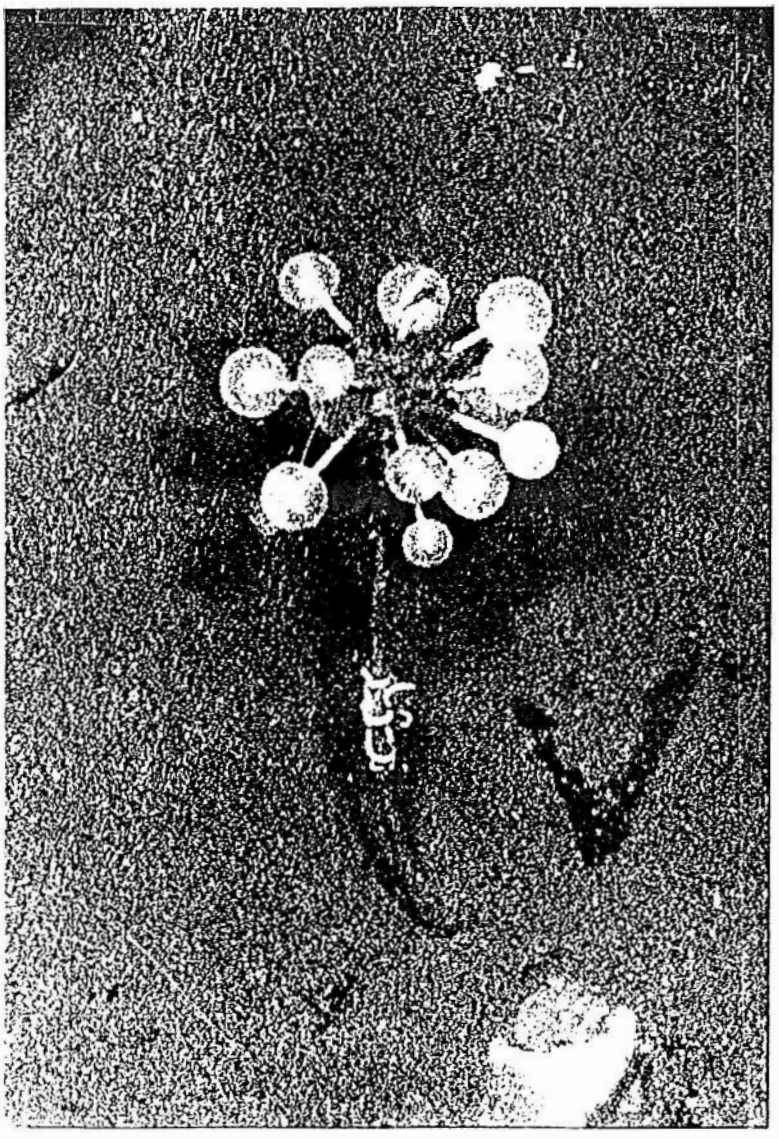
AN ENIGMATIC ORGANISM DISCLOSED - AND SOME NEW ENIGMA

In the last issue of D-S.N.(no 20: 12-15) OT and DB discussed the distribution and biology of the large clubsponge *Chondrocladia gigantea* (Hansen, 1885). When a poster on the same theme was shown at the 4th International Porifera Congress in Amsterdam in April 1993, KT told us about new observations made from the Russian submersible "Mir-2". The information reveals the nature of a class of enigmatic organisms encountered now and again in deep-sea photographs and makes the function of some conspicuous morphological structures in members of the genus *Chondrocladia* an intriguing challenge.

During a dive at abyssal depths in the North Pacific, "Mir-2" met a peculiar, stalked organism about 50 cm high (Fig. 1). The lower end of the 6 mm thick cylindrical stalk came out of the mud. The upper end supported a poorly defined, spherical head about 3 cm in diameter, from which 10-15 thin, cylindrical branches radiated in all directions. At the free end each branch carried a translucent sphere, 1-2 cm in diameter.

The organism was collected with the movable arm of the submersible. On deck, it was obvious that it was a sponge, and the spheres at the tips of the branches were shrunk into the somewhat oblong, clavate, relatively massive structures characteristic of the branches of a number of *Chondrocladia* species called "the concrescens group" (Fig. 2).

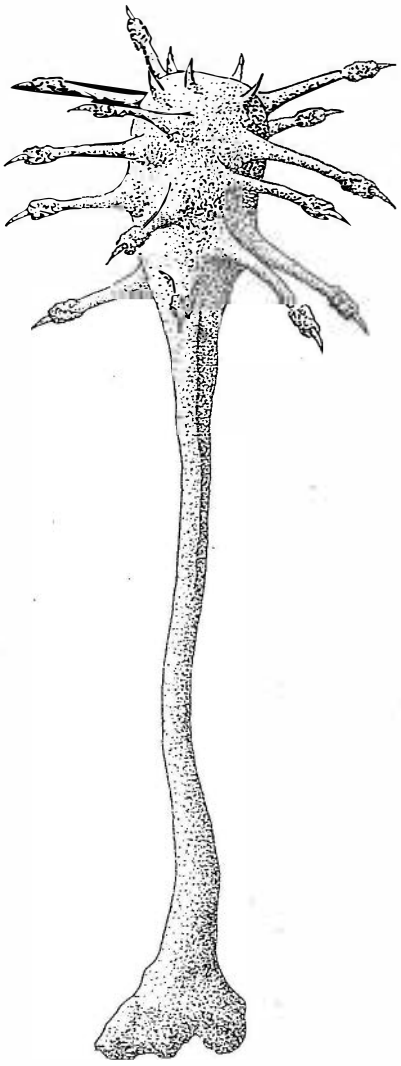


The peculiar organism was photographed during a dive to 5320 m depth at 54°59.25'N, 165°42.50'E (J. Volodin phot.)

Bottom photographs showing the extended sponge have been taken before, but because of lack of identification they seem, with one exception, not to have been published. The single case is found in a manual for submersible pilots (Segonzac 1987) where a photo shows the same kind of organism from between 2000 and 3000 m in the East Pacific. It is called "Boules" and texted as "Tous les zoologistes interrogées ignorent la nature de cet organisme"!

What is the function of the papillae that obviously under natural conditions, at least part of the time, are so swollen that they become thin and transparent as opposed to the collapsed condition where they are massive, although "spongy" in texture?

Lundbeck (1905) described the gross morphology of the papillae of *C. gigantea*: In the central part is a longitudinal axis consisting of a bundle of skeletal fibers. Around it is a lacunous



A generalized *Chodrocladia* of "the concrescens group"

tissue with only few spicules. Outermost is a denser tissue with many spicules. Parts of the canal system can be seen here and there, running longitudinally. In the narrow part of the papilla the lacunous tissue constitutes only a thin layer, while in the swollen outer part it is thicker and either fills the interior completely or only to some degree, the rest being occupied by a large cavity. The very end is provided with numerous small openings.

The spheres must be parts of the canal system. The inflation means that they contain much water in relation to tissues, and the transparency shows the tissues to be thin. One can imagine that the flagellate cells driving the water and creating the pressure necessary, sit in membrane-like interior structures, the outer layer being the most resistant and keeping the shape. This would require an arrangement unusual for a demosponge. The whole seems very delicate, much like in hexactinellids. The single spherical, cavernous, membraneous unit probably performs its functions rather independently of the rest of the sponge, although there must be some connection to the central head that may serve as a kind of brooding area, like in *C. gigantea*. We are investigating these possibilities.

The incident serves as another example of how different some sponges can behave when being in their natural environment as compared to on the deck. It also emphasizes the value of *in situ* photographs of identified species (samples from the area!) when interpreting aspects of their biology (Barthel *et al.* 1991).

References

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